○Multi-dimension integer, floating point and string arrays
○Extensive support for string handling
○IF . . . THEN . . . ELSE
○REPEAT . . . UNTIL
○Multi-line integer, floating point and string functions
○Procedures
○Local variables
○Full recursion on all functions and procedures
○Effective error trapping and handling
○Cassette loading and saving of programs and data
○Full support for the extensive colour graphics facilities
○Easy control of the built-in music generation circuits
○Built-in 6502 mnemonic assembler enabling BASIC and assembler to be mixed, or pure assembly language programs to be produced.

Econet®

The Econet® communications network enables a number of computers to share expensive resources such as a printer and a disc 'file server'. The system is primarily intended for schools and colleges but also lends itself to many office and business applications.

○Up to 254 stations may share the network facilities
○Connection between stations is by cheap 4 wire 'telephone' cable
○The network may be up to 400 metres from end to end
○Very low interface cost on each computer
○More than one printer or file server may be on the net
○Any station can 'view' any other similar station's screen
○Messages may be passed between any machines
○Stations may be plugged or unplugged at any time.

Because of the low costs involved, it is possible to dedicate one computer as a file server and one as a printer server. However, once pupils have loaded files from the file server, there is no reason why the file server computer should not be used as a normal disc computer until it is again required to act as a file server. The same flexibility applies to the printer server.

Service

Technical support and service can be obtained from a number of sources:

Pre-sale advice (please send a large SAE) from
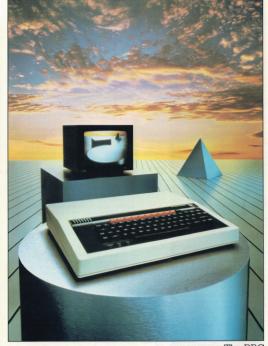**BBC Microcomputer System**
PO Box 7
London W3 6XJ

After sales service and advice by a national dealer network (see list) and Retail Control Systems Limited, Gresham House, Twickenham Road, Feltham, Middlesex TW13 6HA

Both Model A and Model B Computers are despatched with a mains lead and a lead to enable the computer to be connected to a domestic television set. In addition, a substantial User Guide, a cassette containing about fifteen demonstration programs and a leaflet describing these programs is included with the machine.

This description and specification is subject to change without notice.

*CP/M is a registered trademark of Digital Research
**Only some expansion options are available for Model A

Price and specification subject to change without notice.

The BBC Microcomputer System

Processor

The unit uses a 2MHz 6502

Memory

Model A: 16K of Random Access Memory (RAM)
Model B: 32K of Random Access Memory (RAM)

A 16K Read Only Memory (ROM) integrated circuit contains an extensive and powerful Machine Operating System designed to interface easily to high level languages.

A further 16K Language ROM contains an extremely powerful and fast BASIC interpreter. The interpreter includes a 6502 assembler which enables BASIC statements to be freely mixed with 6502 assembly language.

Up to four 16K Language ROMs may be plugged into the machine at any time. These four ROMs are 'paged' and may include Pascal, word processing, computer aided design software, disc and Econet® routines or Teletext filing system.

Keyboard

73 key full travel QWERTY keyboard with 10 user definable function keys. The keyboard has two key rollover and auto repeat.

Display

The standard television output is 625 line 50Hz, interlaced, fully encoded PAL; modulated on UHF channel 36. Other standards are available.

The full-colour full Teletext display of 40 characters by 25 lines will have full character rounding with double height, flashing, coloured background and text – all to the Teletext standard.

The non Teletext display modes provide user definable characters in addition to the standard upper and lower case alpha-numeric font. In these modes, graphics may be freely mixed with text. Text characters can be positioned not only on, for example, a 40×32 grid, but at any intermediate position.

Separate or overlapping text and graphic windows can be easily user-defined over any area of the display. Each of these windows may be filled separately and text may be scrolled up or down within the text window.

The following display modes can be used

Model B only	0 640×256 2 colour graphics and 80×32 text	(20K)
	1 320×256 4 colour graphics and 40×32 text	(20K)
	2 160×256 16 colour graphics and 20×32 text	(20K)
	3 80×25 2 colour text	(16K)
Models A and B	4 320×256 2 colour graphics and 40×32 text	(10K)
	5 160×256 4 colour graphics and 20×32 text	(10K)
	6 40×25 2 colour text	(8K)
	7 40×25 Teletext display	(1K)

The installed RAM is divided between the high resolution graphics display, the user's program and Machine Operating System variables. The Machine Operating System requires about 3½K of RAM in the Model A. If higher resolutions are required with large programs then the second processor option may be fitted.

All graphics access is 'transparent' resulting in a fast snow-free display.

Extensive support is provided in the Machine Operating System for the graphics facilities, and this is fully reflected in the BASIC interpreter. These facilities include the ability to draw lines rapidly and to fill large areas of colour. In addition, very rapid changes of colour can be effected.

A BNC connector supplies a composite video output to drive a black and white monitor.

External storage

A standard audio cassette recorder can be used to record computer programs at 300 or 1200 baud using the CUTS standard tones. The cassette recorder is under full automatic motor control and is connected to the computer via a seven pin DIN connector.

Tone generation

The internal loudspeaker is driven from a 3-voice music synthesis circuit with full ADSR envelope control, and there is also a noise channel.

Interfaces (Model B only)

Serial interface to RS423 standard. This standard has been designed to be inter-operable with RS232C equipment but offers a considerably enhanced specification – for example in maximum length of cable and maximum data transfer rates. Baud rates are software selectable between 75 baud and 19,200 baud. The interface provides not only two way data transfer, but also two way hand-shaking using RTS and CTS lines. Connection to the machine is made via a 5 way 'diamond' DIN connector and various interconnecting plugs are available for the various standard 25 way D type circuits.

An 8 bit 'Centronics type' parallel printer port is provided with 'strobe' and 'acknowledge' lines.

An RGB video output is provided to drive a high quality colour monitor.

An 8 bit input/output port is also provided.

Four 12 bit analogue input channels are provided. Each channel has an input voltage range of 0-1.8V and the interval converter provides a number in the range 0 to 4095×16. The conversion time for each channel is 10 milliseconds and when the conversion is complete, the processor is interrupted and the value stored in a memory location for later access. These analogue inputs can be used not only in laboratory control situations, but also for inputs for games – paddles or joysticks.

A 1MHz buffered extension bus is provided for connection to Prestel, Teletext or various other expansion units.

Expansion

Both Model A** and Model B may have the expansion options fitted internally at purchase, or by dealers at a later date.

○ Floppy disc interface
○ Econet® network interface (separate leaflet available)
○ Voice synthesis circuits and cartridge ROM pack interface
○ Various alternative high-level languages in ROM

External options which plug directly into the machine include:

○ Paddles
○ Cassette recorders
○ Black and white and colour monitors and televisions
○ 5¼ inch single-sided disc drives (100K)
○ 5¼ inch dual double-sided double track density disc drives (800K)
○ 80 column dot-matrix printers
○ Daisy wheel printers
○ Teletext and Prestel acquisition units

Both of these enable Telesoftware to be downloaded into the BBC Computer as well as providing access to the normal Teletext/Prestel services. Pages may be 'grabbed' and stored for later use.

○ 6502 second processor with 64K of RAM
○ Z80 second processor with 64K of RAM, a CP/M* 2.2 operating system plus software
○ IEEE 488 interface
○ 1MHz bus for connection of extra facilities

Software

Considerable attention has been paid to the overall design of the system and application software. A modular approach has been adopted specifically to ease the interfacing of various high-level languages (such as BASIC and Pascal) to the operating system.

Machine Operating System (MOS)

A 16K ROM is used for the MOS. This software controls all input-output devices using a well defined interface. The MOS supports the following interrupts:

○ Event timer (used as elapsed time clock)
○ 4 channel analogue to digital converter
○ Vertical sync
○ Keyboard and keyboard buffer
○ Music tone generation and buffer
○ Serial interface, input and output, and buffers
○ Parallel input/output port

and 'hooks' are provided to support other devices such as:

○ Tube
○ Teletext filing system
○ Prestel filing system
○ Econet® filing system
○ Disc filing system

Many of the operating system calls are vectored to enable the user to change them if required at a future date.

BASIC

The BASIC interpreter is an extremely fast implementation, very close to the Microsoft standard but with numerous powerful extensions:

○ Long variable names
○ Integer, floating point and string variables